

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

In the Matter of )  
Petition of WorldCom, Inc. Pursuant )  
To Section 252 (e)(5) of the )  
Communications Act for Expedited )  
Preemption of the Jurisdiction of the )  
Virginia State Corporation Commission )  
Regarding Interconnection Disputes )  
With Verizon Virginia, Inc., and for )  
Expedited Arbitration )

CC Docket No. 00-218

In the Matter of )  
Petition of Cox Virginia Telecom, Inc. )  
Pursuant to Section 252 (e)(5) of the )  
Communications Act for Preemption )  
Of the Jurisdiction of the Virginia State )  
Corporation Commission Regarding )  
Interconnection Disputes with Verizon )  
Virginia, Inc. and for Arbitration )

CC Docket No. 00-249

In the Matter of )  
Petition of AT&T Communications )  
Virginia Inc., Pursuant to Section 252 (e)(5) )  
of the Communications Act for Preemption )  
of the Jurisdiction of the Virginia )  
Corporate Commission Regarding )  
Interconnection Disputes with Verizon )  
Virginia, Inc. )

CC Docket No. 00-251

**PANEL REPLY TESTIMONY**

**ON BEHALF OF AT&T AND WORLDCOM, INC.**

**ON NON-RECURRING COSTS AND ADVANCED DATA SERVICES**

**\*\*\*PUBLIC VERSION\*\*\***

**AUGUST 27, 2001**

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**Attachment A: Verizon's Proposed Non-Recurring "Conditioning" Charge Does Not  
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Necessary to Remove Load Coils and/or Excessive Bridged Tap**

1    **I.       INTRODUCTION AND SUMMARY**

2    **Q.       MS. MURRAY, PLEASE STATE YOUR NAME, TITLE AND BUSINESS**  
3       **ADDRESS.**

4    A.       My name is Terry L. Murray. I am President of the consulting firm Murray &  
5             Cratty, LLC. My business address is 227 Palm Drive, Piedmont, CA 94610.

6    **Q.       MS. MURRAY, HAVE YOU PREVIOUSLY TESTIFIED IN THIS**  
7       **PROCEEDING?**

8    A.       Yes, I filed direct testimony on behalf of AT&T Communications of Virginia,  
9             Inc.,<sup>1</sup> ("AT&T") and WorldCom, Inc. ("WorldCom"). Exhibit (TLM-1) to that  
10            testimony provides a summary of my qualifications and experience. I am also  
11            filing concurrently two other pieces of reply testimony, individually on economic  
12            and policy issues and, as a member of a panel, on recurring cost issues.

13   **Q.       MR. WALSH, PLEASE STATE YOUR NAME, TITLE AND BUSINESS**  
14       **ADDRESS.**

15   A.       My name is Richard J. Walsh and my business address is 33 Francis Drive,  
16             Hillsborough, New Jersey, 08844. I am presently providing consulting services to  
17             AT&T as a Technical Analyst in the Local Services and Access Management  
18             (LSAM) / Local Connectivity Cost, Price, and Planning Division. I have also

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<sup>1</sup>       This reply testimony is presented on behalf of AT&T Communications of Virginia, Inc., TCG Virginia, Inc., ACC National Telecom Corp., MediaOne of Virginia and MediaOne Telecommunications of Virginia, Inc. (together, "AT&T").

1           been retained by WorldCom for the purpose of analyzing and critiquing the non-  
2           recurring cost model and rates proposed by Verizon Virginia in this proceeding.

3   **Q.    HAVE YOU PREVIOUSLY TESTIFIED IN THIS PROCEEDING?**

4   A.    Yes, I filed direct testimony on behalf of AT&T and WorldCom. My  
5           qualifications were included with that testimony.

6   **Q.    MR. RIOLO, PLEASE STATE YOUR NAME, TITLE AND BUSINESS**  
7           **ADDRESS.**

8   A.    My name is Joseph P. Riolo. I am an independent telecommunications consultant.  
9           My business address is 102 Roosevelt Drive, East Norwich, NY 11732.

10  **Q.    MR. RIOLO, HAVE YOU PREVIOUSLY TESTIFIED IN THIS**  
11           **PROCEEDING?**

12  A.    Yes. I submitted Direct Testimony in this proceeding on behalf of AT&T and  
13           WorldCom on July 31, 2001. My qualifications were included as Exhibit JPR-1  
14           to that testimony. I am also filing testimony concurrently as a member of a panel  
15           on recurring cost issues.

16  **Q.    WHAT IS THE PURPOSE OF YOUR PANEL REPLY TESTIMONY ON**  
17           **NON-RECURRING AND ADVANCED SERVICES COSTS?**

18  A.    AT&T and WorldCom have asked us to review and respond to the direct  
19           testimony and cost study presentations filed by Verizon Virginia, Inc. ("Verizon  
20           VA" or "Verizon"). In particular, we will rebut Verizon's Panel Testimony on  
21           Unbundled Network Element and Interconnection Costs ("Verizon Cost Panel

1 Direct”)<sup>2</sup> with respect to non-recurring costs and costs associated with advanced

2 data services. Based on our review:

3 Verizon’s non-recurring cost (“NRC”) study produces costs inflated far above

4 Total Element Long Run Incremental Cost (“TELRIC”) levels due to a long list of

5 significant flaws, including:

- 6
- 7 • reliance on Verizon’s embedded network architecture instead of a
  - 8 reconstructed forward-looking network;
  - 9
  - 10 • failure to assume the most efficient mix of technology;
  - 11
  - 12 • inclusion of archaic universal digital loop carrier (“UDLC”) technology;
  - 13
  - 14 • inclusion of substantial recurring costs;
  - 15
  - 16 • inclusion of excessive fallout and manual labor instead of mechanization;
  - 17
  - 18 • inclusion of costs not caused by competitive local exchange carriers
  - 19 (“CLECs”);
  - 20
  - 21 • creation of an elaborately inefficient and complex hotcut process to
  - 22 accomplish a simple migration; and
  - 23
  - 24 • bundling of disconnect costs into connect charges.
  - 25

26 Moreover, Verizon has employed a faulty survey methodology to estimate the

27 costs of this flawed non-recurring cost construct. Not only is the methodology flawed,

28 but the results of that survey are plainly inconsistent with the real-world experience of

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<sup>2</sup> The members of Verizon’s Cost Panel are Donald Albert, Ralph Curbelo, Joseph  
(continued)



1 Mr. Walsh and Mr. Riolo, who have personally managed and/or performed many of the  
2 tasks included in Verizon's studies.

3  
4 We recommend that the Commission reject Verizon's non-recurring cost study  
5 and accept the Non-Recurring Cost Model ("NRCM") proposed by AT&T/Worldcom  
6 because, as Ms. Murray and Mr. Walsh verified in their direct testimony, the  
7 AT&T/WorldCom NRCM properly reflects the manner in which an efficient carrier  
8 would provision UNEs over a truly forward-looking network. Moreover, the  
9 AT&T/WorldCom NRCM correctly classified recurring vs. non-recurring costs and  
10 attributes costs to the cost causer. Verizon's non-recurring cost study lacks all of these  
11 desirable properties.

12  
13 With regard to advanced data services, we recommend that the Commission:

- 14
- 15 • prohibit Verizon or any its affiliates from providing DSL-based services  
16 over fiber facilities until Verizon has in place approved rates, terms and  
17 conditions for such services for unaffiliated competitors;
  - 18 • make CLEC use of Verizon Wideband Testing Systems optional;
  - 19 • reject Verizon's asserted costs for development and maintenance of OSS  
20 for line sharing as unsubstantiated and, in any event, more appropriately  
21 recurring costs;  
22  
23  
24

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Gansert, Nancy Matt, Louis Minion, Mike Peduto, Gary Sanford, and John White.

- reject Verizon's attempt to use its Two Wire New Initial as and Two Wire New Additional loop costs to generate per line costs for line sharing;
- base line sharing costs on the assumption of most efficient splitter placement;
- reject Verizon's proposed EF&I factor as inappropriate;
- reject Verizon's Administrative & Support charge for Option A and reduce it to \$4.05 per month for Option C;
- order Verizon to generate a direct estimate of its splitter installation costs;
- reject the cooperative testing charge as unnecessary;
- reject the proposed line conditioning charges as embedded costs and unreasonably excessive in any event;
- reject the proposed charge to add ISDN electronics as a recurring cost; and
- reject Verizon's loop qualification charges as recurring database development and maintenance cost.

The remainder of our testimony explains the basis for each of these conclusions.

**II. VERIZON'S NON-RECURRING COST ANALYSIS DOES NOT COMPLY WITH TELRIC.**

**Q. DO THE VERIZON NON-RECURRING COST STUDIES THAT YOU REVIEWED COMPLY WITH FORWARD-LOOKING ECONOMIC COST PRINCIPLES?**

A. No. Ms. Murray discusses in both her direct testimony and her concurrently filed reply to Drs. Gordon and Shelanski the forward-looking economic cost principles that should apply to a non-recurring cost study. To be consistent with these

1 principles, the non-recurring charges to provision UNEs should reflect forward-  
2 looking, efficiently incurred costs in accordance with the requirements set forth by  
3 this Commission pursuant to the Telecommunications Act of 1996 (the "Act").

4 The non-recurring charges should reflect to the greatest extent possible a  
5 mechanized, non-manual process, which minimizes costly human intervention. In  
6 addition, the non-recurring charges should recover only truly non-recurring costs  
7 and not the costs of constructing and maintaining the network, which are properly  
8 recovered in Verizon's recurring charges.<sup>3</sup>

9 In essence, this Commission should set prices based on the costs that an  
10 efficient incumbent operating in a competitive environment, using the most  
11 efficient technology available today, would incur. Such prices will not force  
12 competitors to compensate Verizon for costs stemming from any past or  
13 embedded inefficiency. Prices based on efficient, forward-looking costs will  
14 encourage Verizon to become more efficient in the provisioning of UNEs and will  
15 encourage the development of competition in the local exchange market.

16 As we discuss in more detail below, Verizon's non-recurring cost analyses  
17 include numerous tasks, task times and assumptions that are inconsistent with  
18 these forward-looking economic cost principles. At an overall level, Verizon has

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<sup>3</sup> *Implementation of the Local Competition Provisions in the Telecomms. Act of 1996*, First Report and Order, 11 FCC Rcd. 15499 (1996) ("*Local Competition Order*") at ¶ 746 ("We find that recovering a recurring cost through a nonrecurring charge would be unjust (continued)

1 not based its non-recurring cost studies on a forward-looking reconstructed  
2 network. Instead, the Verizon non-recurring cost studies rely on data pertaining to  
3 its existing, embedded processes and its existing, embedded network  
4 architectures. For example, Verizon unaccountably presumes an inordinate level  
5 of manual intervention at all stages of the ordering and provisioning. Although  
6 Verizon applies some “forward-looking adjustments” to current work times and  
7 occurrences, such adjustments are not widespread across all work activities, nor  
8 do they address the fundamental flaw of relying on data pertaining to existing  
9 processes and network architectures, rather than forward-looking processes and  
10 network architectures.

11 In addition, the Verizon non-recurring cost study inappropriately includes  
12 fieldwork and other activities that Verizon should have reflected, and in many  
13 cases probably did include, in its recurring cost study.

14 Finally, Verizon’s proposed non-recurring charges violate the principle of  
15 cost causation and would create barriers to entry, because Verizon has bundled  
16 disconnect costs into its connect charges.

17 For all of these reasons, Verizon’s non-recurring cost studies do not  
18 comply with this Commission’s mandate that “NRCs must be set to “ensure that

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and unreasonable because it is unlikely that incumbent LECs will be able to calculate properly the present value of recurring costs.”)

1 incumbent LECs do not recover nonrecurring costs twice and that nonrecurring  
2 charges are imposed equitably . . .”<sup>4</sup>

3

4 **Q. HOW IS VERIZON’S NON-RECURRING COST STUDY APPROACH**  
5 **DEFICIENT?**

6 A. For most work activities, surveys of existing work functions and work times  
7 associated with those functions provided the baseline for the non-recurring cost  
8 study. Verizon’s survey methods and procedures were flawed.

9 Verizon did apply “forward-looking adjustment factors” that, it purports,  
10 reflect the benefits of gains in labor productivity and mechanization  
11 advancements.<sup>5</sup> According to Verizon’s Cost Panel, these adjustment factors  
12 represent the frequency with which Verizon expects to perform an activity in the  
13 forward-looking period.<sup>6</sup> However, as we discuss further below, Verizon’s  
14 adjustments do not go far enough. In fact, Verizon’s “forward-looking  
15 adjustment” factor does not address such basic backward-looking assumptions as  
16 having to retype a significant percentage of orders that competitors have already  
17 generated in a fully electronic format.

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<sup>4</sup> *Local Competition First Report and Order* at ¶ 750.

<sup>5</sup> Verizon Cost Panel Direct at 317.

<sup>6</sup> Verizon Cost Panel Direct at 316.

1 Verizon's flawed survey approach, combined with the *ad hoc* and limited  
2 nature of Verizon's forward-looking adjustments, produces a set of non-recurring  
3 costs that violate forward-looking cost principles.

4 **Q. ARE VERIZON'S REPORTED WORK TIMES A RELIABLE BASIS FOR**  
5 **CALCULATING NON-RECURRING COSTS?**

6 A. No. Verizon apparently derived its work-time estimates by surveying its  
7 employees.<sup>7</sup> Verizon committed numerous errors in survey design, data collection  
8 and data processing. These errors contributed to the inflation of Verizon's study  
9 results and render those results useless for estimating the cost of efficient  
10 activities.

11 We discuss the inherent flaws in Verizon's survey approach and  
12 implementation further in Section III.

13 **A. VERIZON'S FORWARD-LOOKING NETWORK ASSUMPTION IS**  
14 **FLAWED.**

15 **Q. HAS VERIZON RELIED ON THE CORRECT FORWARD-LOOKING**  
16 **NETWORK ARCHITECTURE AND TECHNOLOGY MIX TO**  
17 **CALCULATE ITS NON-RECURRING COSTS?**

18 No. As Ms. Murray explains further in her separately filed rebuttal to Drs.  
19 Gordon and Shelanski, Verizon has based its non-recurring cost studies upon its  
20 existing embedded network, updated only to consider expected changes over a

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<sup>7</sup> Verizon Cost Panel Direct at 311.

1 three-year planning horizon. Verizon's reliance on actual, existing network  
2 equipment, configurations, processes and procedures and actual planned  
3 enhancements does not—indeed cannot—satisfy the requirement that the costs  
4 used to establish UNE prices, both recurring and non-recurring, must reflect the  
5 least-cost, most efficient and forward-looking network and systems currently  
6 available.

7 Furthermore, Verizon readily admits that the network construct it used to  
8 model recurring costs is different from the one used to model non-recurring costs.  
9 As Ms. Murray explained in her direct testimony and elaborates in her separately  
10 filed response to Drs. Gordon and Shelanski, the forward-looking network  
11 constructs assumed must be the same for both recurring and non-recurring costs.

12 Exhibit AT&T/WCOM NRCM-1 is a conceptual diagram of the allegedly  
13 forward-looking network architecture on which Verizon has based its non-  
14 recurring cost studies. It reflects the physical equipment (*i.e.*, the plant) necessary  
15 in a forward-looking environment to produce the loop and port elements.

16 The local loop network element is defined in 47 C.F.R. § 51.319 as “a  
17 transmission facility between a distribution frame (or its equivalent) in an  
18 incumbent LEC central office and an end user customer premises.” A local loop  
19 is created by the placement of copper cables from the Network Interface Device  
20 (“NID”) to the Serving Area Interface (“SAI”). At this point, the loop takes one  
21 of two available paths to the central office (*e.g.*, through copper feeder or through  
22 Digital Loop Carrier (“DLC”) over fiber feeder). Within the central office, copper

1 feeder loops will have a termination point on the Main Distribution Frame  
2 (“MDF”). Fiber feeder loops enter the central office on digital facilities, where  
3 they can be directly connected to the LDS (*i.e.*, IDLC), or converted to analog  
4 UDLC facilities having a termination point on the MDF.

5 AT&T/WCOM NRCM-2 shows the physical connections that are  
6 necessary for Verizon’s retail (loop & port) services. The forward-looking  
7 network would produce two types of ports: analog and digital. Analog ports (like  
8 the analog facilities produced by the copper feeder loops and UDLC pairs) will  
9 have a termination point on the MDF. It is at this location (the MDF) that cross-  
10 wires are placed to connect the loop and the port. Digital ports are connected to  
11 digital facilities, which then connect the fiber feeder network to the remote  
12 terminal IDLC equipment. Digital loop/port connections are made electronically  
13 by the OSS. There is no physical cross-wiring work performed on the MDF.

14 AT&T/WCOM NRCM-3 represents the physical connections that are necessary  
15 for interconnecting UNE loops to the CLEC’s equipment Carrier/Connecting  
16 Facility Assignment (“CFA”).

17 For copper feeder loops, a connection is made at the MDF. For fiber  
18 feeder loops, the DS-0 path is redirected to the CLEC’s equipment via the OSS.  
19 This exhibit shows the two distinct methods of interconnection, one being a  
20 physical cross-wire placement connecting the ILEC’s cable pair to the CLEC’s  
21 equipment and the other representing an electronic cross-connect provisioned by  
22 the OSS.



1           AT&T/WCOM NRCM-4 represents the physical connections that  
2           Verizon's non-recurring cost study assumes to be necessary for interconnecting  
3           loops to the CLEC equipment. Verizon converts the IDLC fiber feeder loops to  
4           UDLC so terminations can take place manually at the MDF. The digital loops are  
5           not efficiently redirected to the CLEC's equipment, but instead go through a  
6           costly bypass conversion to UDLC facilities appearing on the MDF. This type of  
7           non-recurring activity is not forward-looking, not least-cost, and does not utilize  
8           currently available efficient technology.

9   **Q.   DO VERIZON'S NON-RECURRING COST STUDIES REFLECT THE**  
10 **MOST EFFICIENT MIX OF TECHNOLOGY?**

11   **A.**   No, Verizon's non-recurring cost studies assume out-moded and inefficient  
12           technology. As Ms. Murray explains in her concurrently filed reply to Drs.  
13           Gordon and Shelanski, this assumed network architecture is even less forward-  
14           looking than the architecture modeled in Verizon's recurring cost studies. Thus,  
15           the network assumed in Verizon's non-recurring studies is even further from the  
16           truly forward-looking network architecture modeled in the Synthesis Model that  
17           AT&T and WorldCom have presented in this arbitration and confirmed by  
18           Verizon's own engineering guidelines. One key example of this is Verizon's  
19           assumption regarding DLC. Verizon indicates that [because] "the network used  
20           to determine *non-recurring* costs should reflect the actual costs that will be

1 incurred in the real forward-looking network, the NRC studies assume that the  
2 network will consist of 26% IDLC and 74% copper/UDLC.”<sup>8</sup> This is far lower  
3 than the forward-looking percentage of IDLC would be, even as Verizon has  
4 assumed for its recurring study.

5 **Q. WHAT IS VERIZON’S JUSTIFICATION FOR THE INEFFICIENT**  
6 **LEVELS OF UDLC IT ASSUMED?**

7 A. Verizon incorrectly claims that a forward-looking network must include UDLC to  
8 provision both unbundled loops and certain kinds of services. To the contrary,  
9 both ISDN and DDS services *can* be provisioned using fiber-fed IDLC, as the  
10 AT&T/WorldCom Recurring Cost Panel explains in its concurrently filed  
11 testimony. In fact, ISDN services are more efficiently provisioned on IDLC  
12 (GR-303), requiring only one port, as opposed to three ports on UDLC. Loops  
13 can also be provisioned digitally, and this should be the case if Verizon assigns  
14 facilities utilizing fiber feeder.

15 **Q. PLEASE EXPLAIN WHY UDLC IS AN OUTMODED AND INEFFICIENT**  
16 **TECHNOLOGY.**

17 A. During the 1970s, the telephone companies deployed UDLC to serve additional  
18 demand and provide loops to customers located quite a distance from the central  
19 office. At that time, the remote terminal DLC equipment converted analog signals  
20 from the customer’s telephone set to digital signals, which traveled over facilities

---

<sup>8</sup> Verizon Cost Panel Direct at 326.

1 to the central office DLC equipment. In the central office, the digital signal was  
2 converted back to analog and the loop had an appearance on the MDF.

3 Conversion to analog was necessary because switches and switch ports at this  
4 time were all analog. Therefore, at the MDF, the telephone company would  
5 connect the cable pair to the office equipment, thus giving the customer service.

6 When digital switches became available, it was no longer necessary to  
7 convert DLC back to analog facilities at the central office. The remote DLC could  
8 be directly integrated into the digital switch. The switches and remote terminals  
9 both spoke this new digital language. This improvement also permitted  
10 elimination of costly central office DLC equipment. The development of IDLC  
11 significantly improved the quality of service, because it eliminated the  
12 cumbersome “analog to digital and back to analog” conversion, which seriously  
13 impaired the quality of service, particularly for modem users.

14 The non-recurring costs modeled by Verizon reflect the use of actual  
15 embedded UDLC, ignoring the fact that IDLC is the efficient forward-looking  
16 technology to use for fiber loops. In addition, Verizon intends to use exclusively  
17 UDLC for unbundling fiber loops, and has chosen this interconnection  
18 methodology to generate the highest possible non-recurring costs, which result  
19 from the need for additional manual central office MDF wiring. This outmoded  
20 and inefficient technology is a prime example of the inflated non-recurring costs  
21 generated by Verizon’s improper network assumptions. This anti-competitive

1 impact is readily apparent in the inefficient migration process Verizon proposes  
2 for customers currently served by fiber-fed loops, which we discuss below.

3 **Q. HOW HAS VERIZON MODELED MIGRATION FOR CUSTOMERS**  
4 **CURRENTLY SERVED BY IDLC?**

5 A. Verizon has assumed that end users with IDLC facilities must be converted to  
6 analog UDLC/copper facilities when migrating their service to a CLEC using the  
7 ILEC's loop. This is absolutely not true—there is no technical limitation  
8 preventing this type of migration; therefore Verizon should have modeled the  
9 situation in which a customer remains on IDLC fiber feeder and is electronically  
10 migrated to the CLEC digital facilities.

11 Verizon has done this by changing the characteristics of loop element by  
12 first requiring that it must contain a physical point of interconnection on physical  
13 arrays called “distribution frames”<sup>9</sup> and then by justifying that the only loops that  
14 have a physical appearance on the MDF is a two-wire “analog” loop. This allows  
15 Verizon to force CLECs into its backward-looking provisioning methodology  
16 which requires that all unbundling must take place at the Central Office MDF to  
17 support the physical point of interconnection.

18 47 C.F.R. § 51.319(a) (i) provides for no such classification of the loop  
19 element being designated as analog or having to have a physical appearance at the

---

<sup>9</sup> Verizon Cost Panel Direct at 78.

1       MDF. The terminology “*or its equivalent*” in 47 C.F.R. § 51.319(a) (i) recognizes  
2       the technology difference in loops.

3               As an article titled “The Virtual RDT, Key to Unbundling the Local  
4       Exchange” concluded:

5               Providing Concentrated Access using the  
6               Multihosting or Virtual RDT concept is the essence  
7               of local access. It provides access to subscriber  
8               lines without the need for dedicated special access  
9               circuits for each subscriber’s line. It decouples  
10              switching and software based services (which can  
11              be provided from a remote host) from functions,  
12              which can be performed by standardized commodity  
13              transmission products available from many vendors.  
14              Concentrated Access can provide the key which  
15              unlocks the Local Exchange Network to open and  
16              fair access to all.<sup>10</sup>

17             This paper builds on a presentation by John Eaves and Paul Zimmerman of  
18       Bellcore (now Telcordia) titled “Impact of SONET on the Evolution of  
19       Telecommunications Network Architectures and Switched-Service Capabilities.”  
20       Their paper showed how the capabilities of IDLC systems conforming to Bellcore  
21       TR-303<sup>11</sup> can be used to provide sophisticated switched services to any subscriber  
22       in a LATA from a small number of host switches which dates back to 1992.

23             A more recent report from Telcordia Technologies titled “Telcordia Notes  
24       on the Networks” also demonstrates this technical feasibility. Telcordia

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<sup>10</sup>       <http://www.sonetech.com/conferences/nfoec-vrtdt.html#r1>.

<sup>11</sup>       Integrated Digital Loop Carrier System Generic Requirements, Objectives, and Interface,  
TR-NWT-000303, Issue 2, Bell Communications Research, December 1992.

1 recognizes eight options for IDLC unbundling, citing the advantages and  
2 disadvantages of each:

3 The most critical factor associated with unbundling  
4 a customer loop is the type of loop facility that the  
5 customer is already utilizing for service, such as all  
6 copper, UDLC system, or IDLC system.

7 • If the customer is receiving service over all-  
8 copper facilities, the transfer of the whole loop  
9 is straightforward as indicated in Figure 12-32.  
10 The ILEC removes the central office connection  
11 to its switch and places a jumper from the MDF  
12 to the meet point at the CLEC's collocation  
13 cage. There is no need to rewire the outside  
14 plant or visit the customer premises.

15 • If the customer is receiving service over a  
16 UDLC system, the transfer of the whole loop  
17 can be straightforward as shown in Figure 12-  
18 3.2. The ILEC removes the central office  
19 connection to its switch and places a jumper  
20 from the MDF to the meet point at the CLEC's  
21 collocation cage. Again, there is no need to  
22 rewire the outside plant or visit the customer  
23 premises.

24 • However, if the customer is served by an IDLC  
25 system, the loop is digitally transmitted to the  
26 ILEC switch. There are a variety of "technically  
27 feasible" options available to the ILEC to  
28 unbundle the loop. Each ILEC has established  
29 its own set of approved unbundling options  
30 along with the corresponding methods,  
31 procedures, and practices needed for  
32 implementing these options. Numerous  
33 unbundling options are possible because many  
34 of today's RDTs support multiple kinds of  
35 interfaces such as: GR-303, TR-08, UDLC, and  
36 D4 DS1.

37 • Also, some RDTs are capable of supporting  
38 multiple GR-303 Interface Groups, thereby